FIG 1

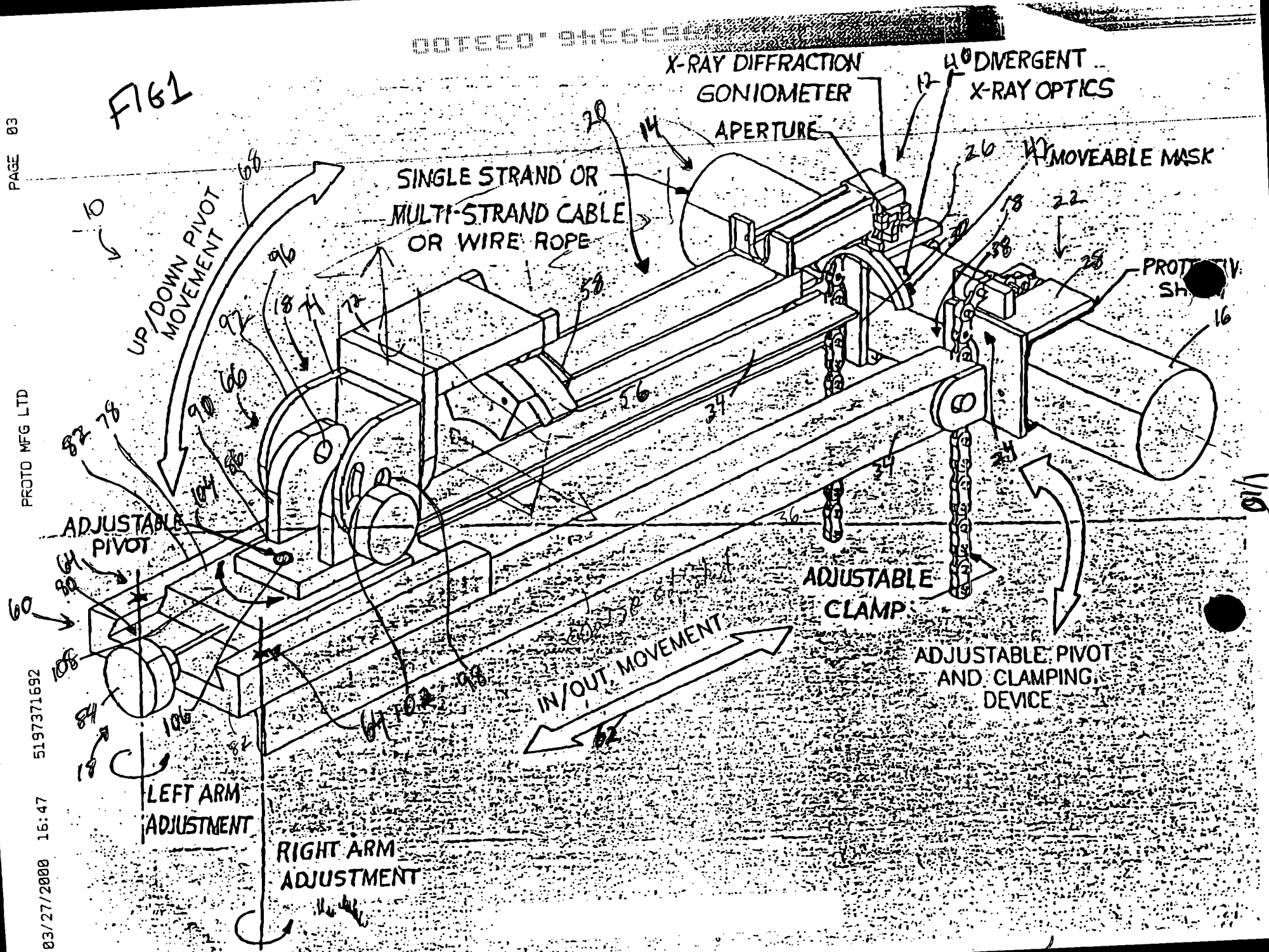

FIG. 2

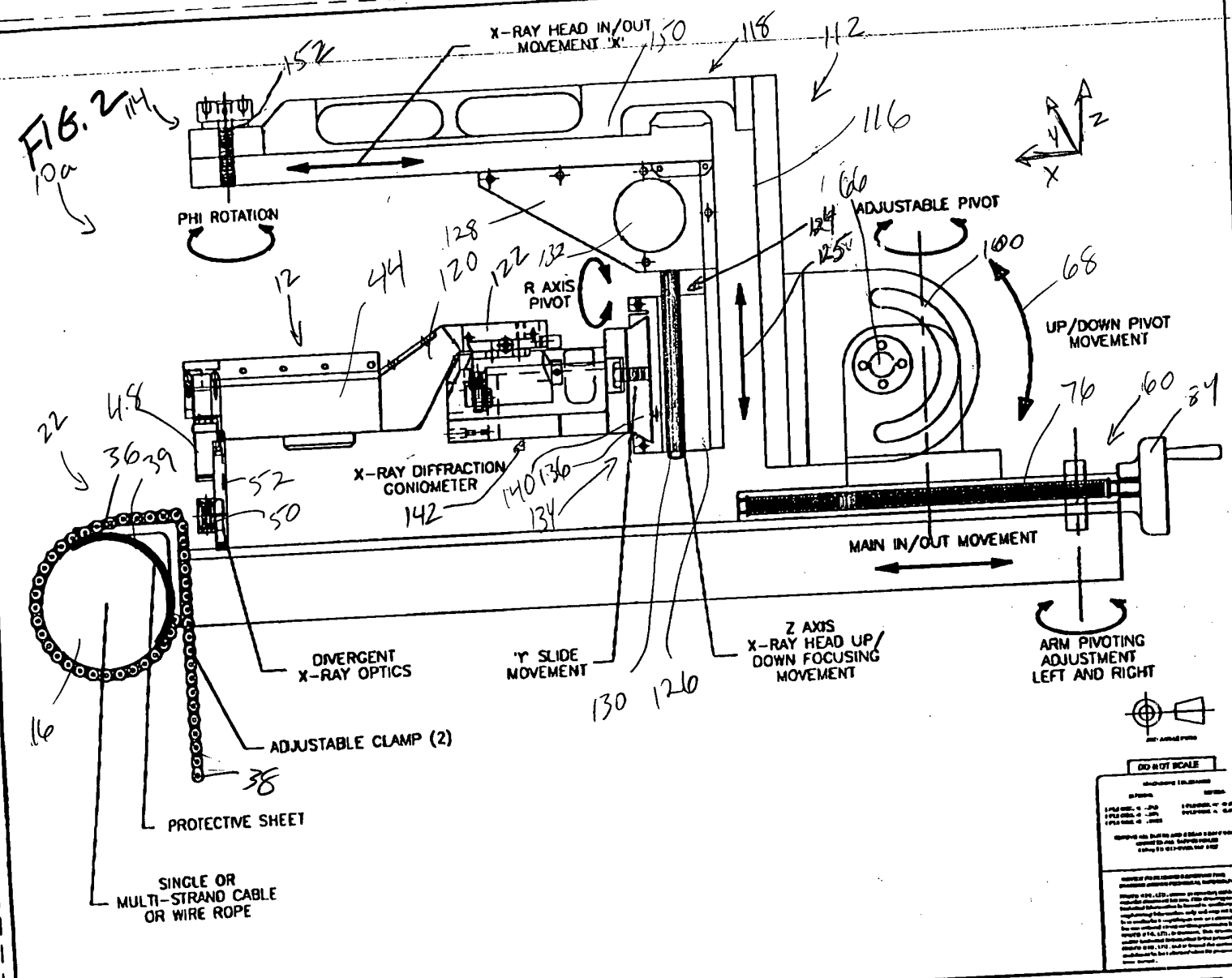

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FIG 4

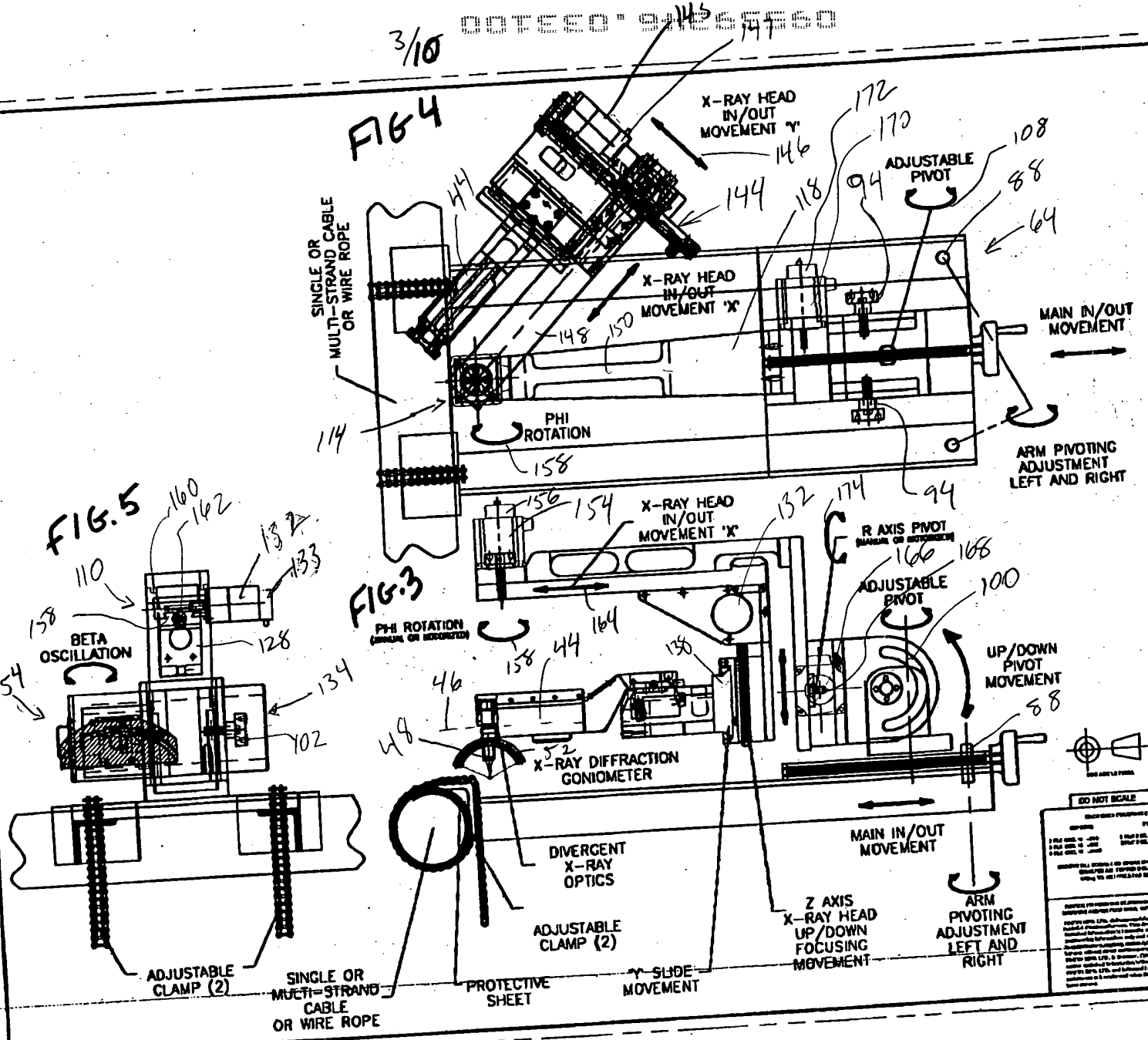

FIG 5

FIG 3

NOTES:

DO NOT SCALE

PROTO

CABLE STRESS ANALYSIS XRD SYSTEM

RD-103

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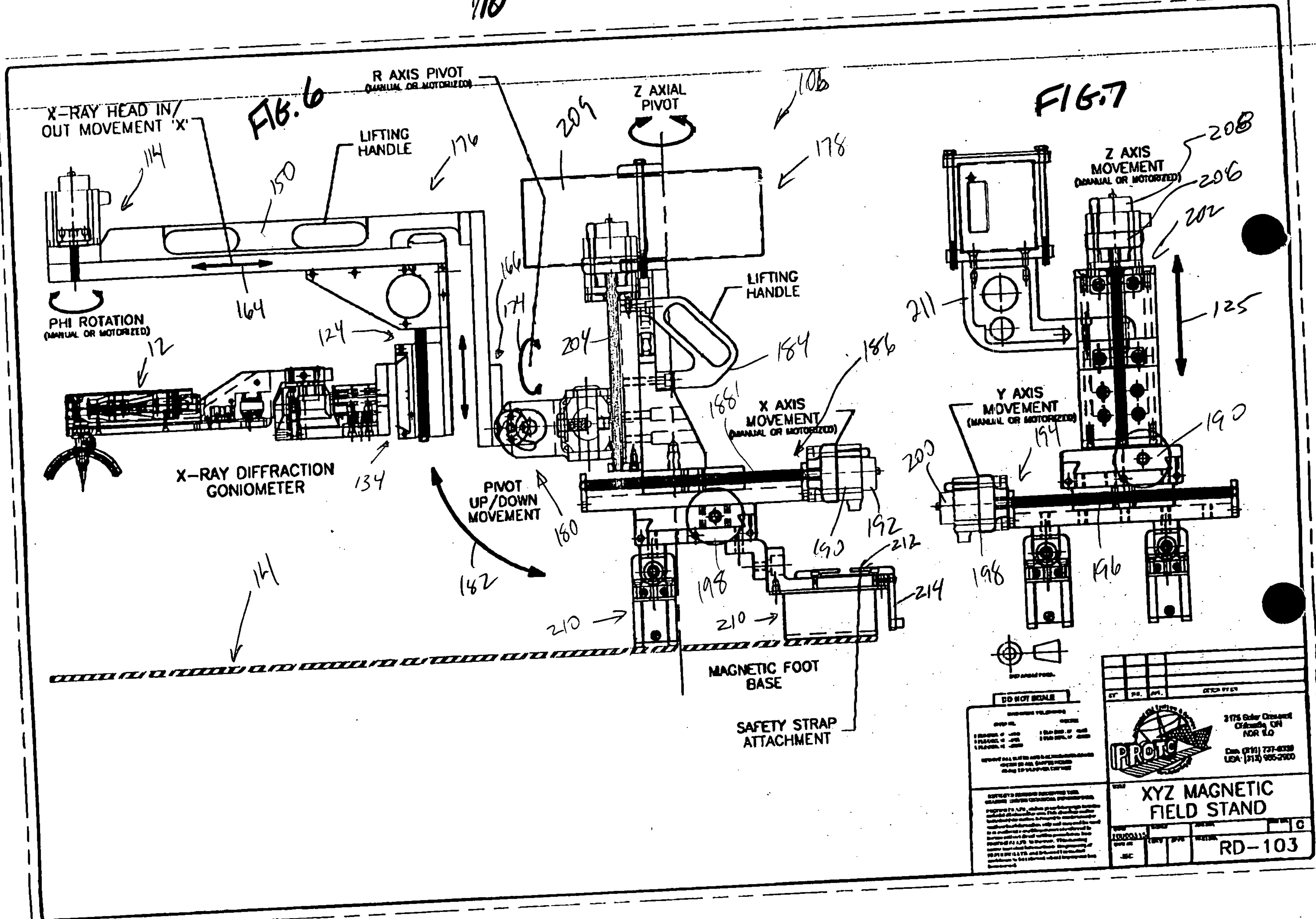
FIG. 6
FIG. 7
X-RAY HEAD IN/ OUT MOVEMENT 'X'
LIFTING HANDLE
R AXIS PIVOT (MANUAL OR MOTORIZED)
Z AXIAL PIVOT
LIFTING HANDLE
PHI ROTATION (MANUAL OR MOTORIZED)
X-RAY DIFFRACTION GONIOMETER
PIVOT UP/DOWN MOVEMENT
X AXIS MOVEMENT (MANUAL OR MOTORIZED)
MAGNETIC FOOT BASE
SAFETY STRAP ATTACHMENT
Z AXIS MOVEMENT (MANUAL OR MOTORIZED)
Y AXIS MOVEMENT (MANUAL OR MOTORIZED)
DO NOT SCALE
PROTO
XYZ MAGNETIC FIELD STAND
RD-103
114
150
164
176
209
106
178
166
174
204
184
186
188
124
12
134
180
182
141
198
190
192
212
214
210
208
206
202
125
211
200
194
196

FIG.8

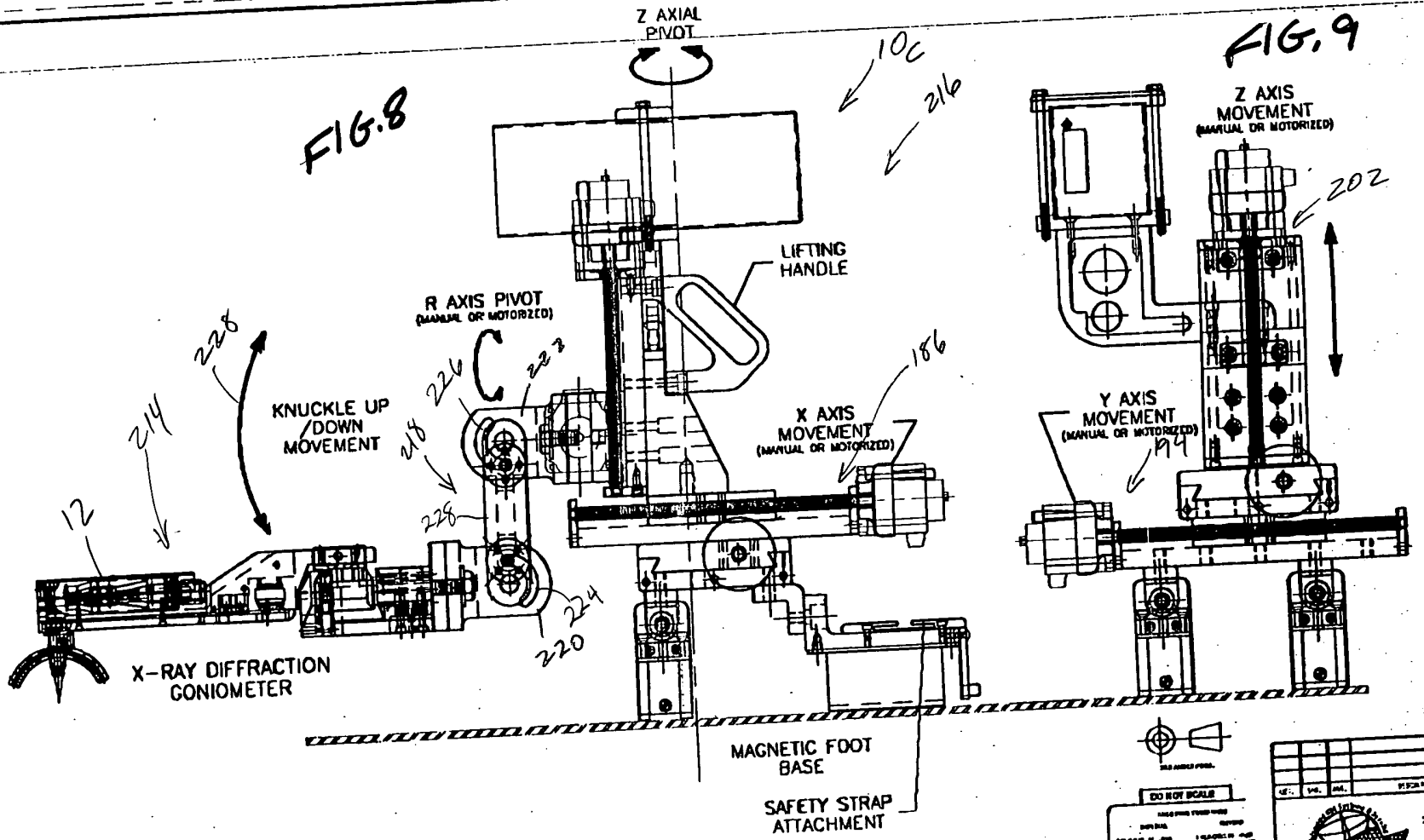

FIG.9

DO NOT SCALE

2171 Solar Crescent
Orleans, ON
K4R 1L9

XYZ MAGNETIC FIELD STAND

RD-103

FIG. 10 6/10

"AUTOFOCUS" flowchart in Proto XRDWin software

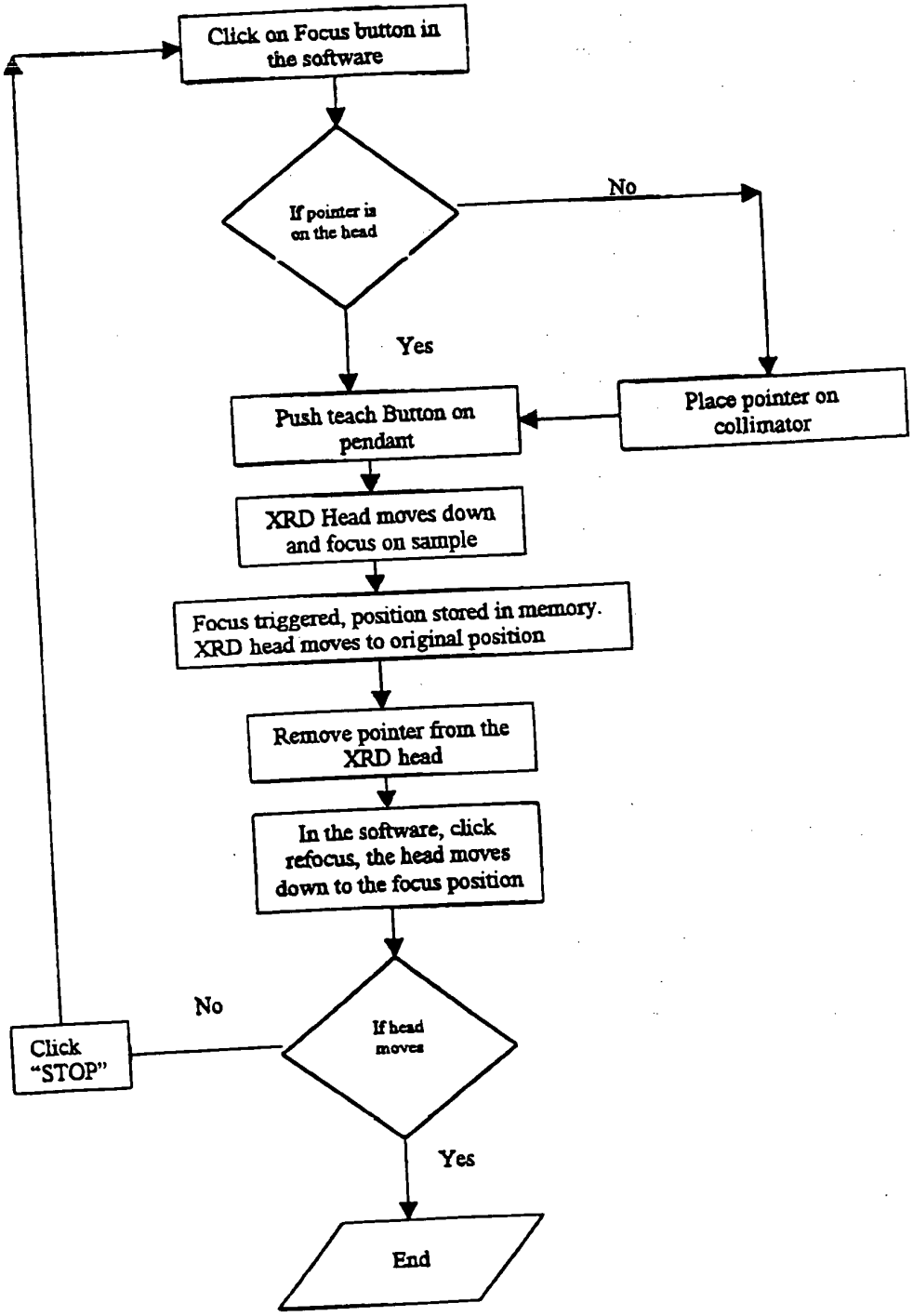

FIG. 11A

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"TEACH- MAP" Flow -Chart

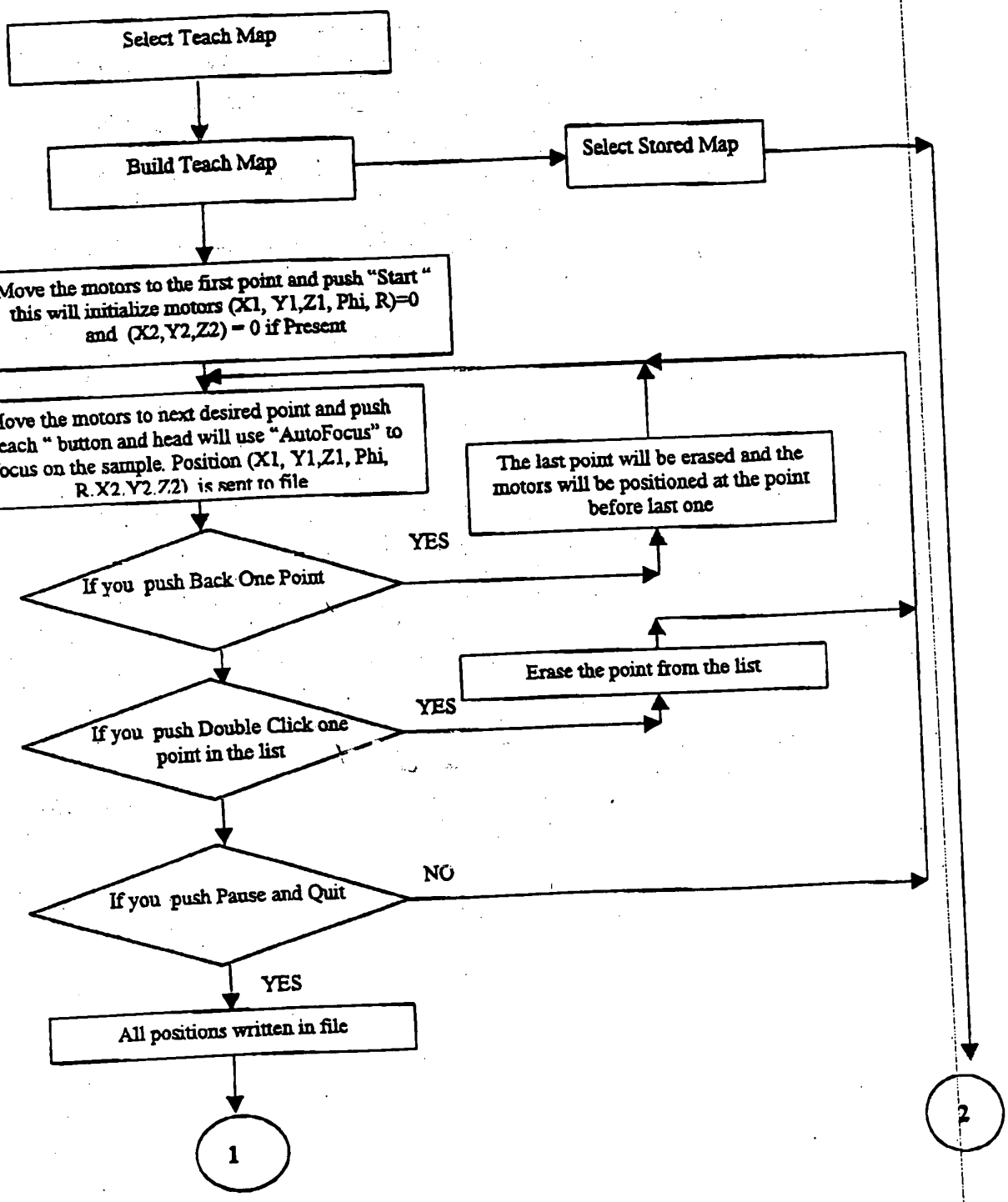

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FIG. 11B

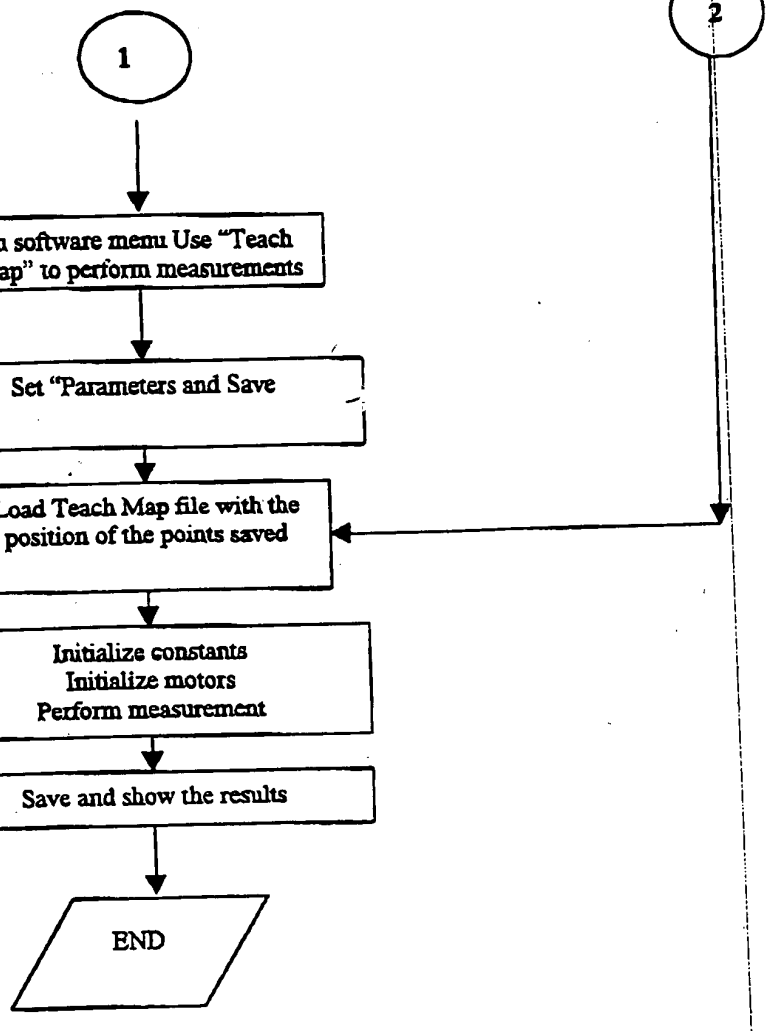
1
2
In software menu Use "Teach Map" to perform measurements
Set "Parameters and Save
Load Teach Map file with the position of the points saved
Initialize constants
Initialize motors
Perform measurement
Save and show the results
END

FIG. 13

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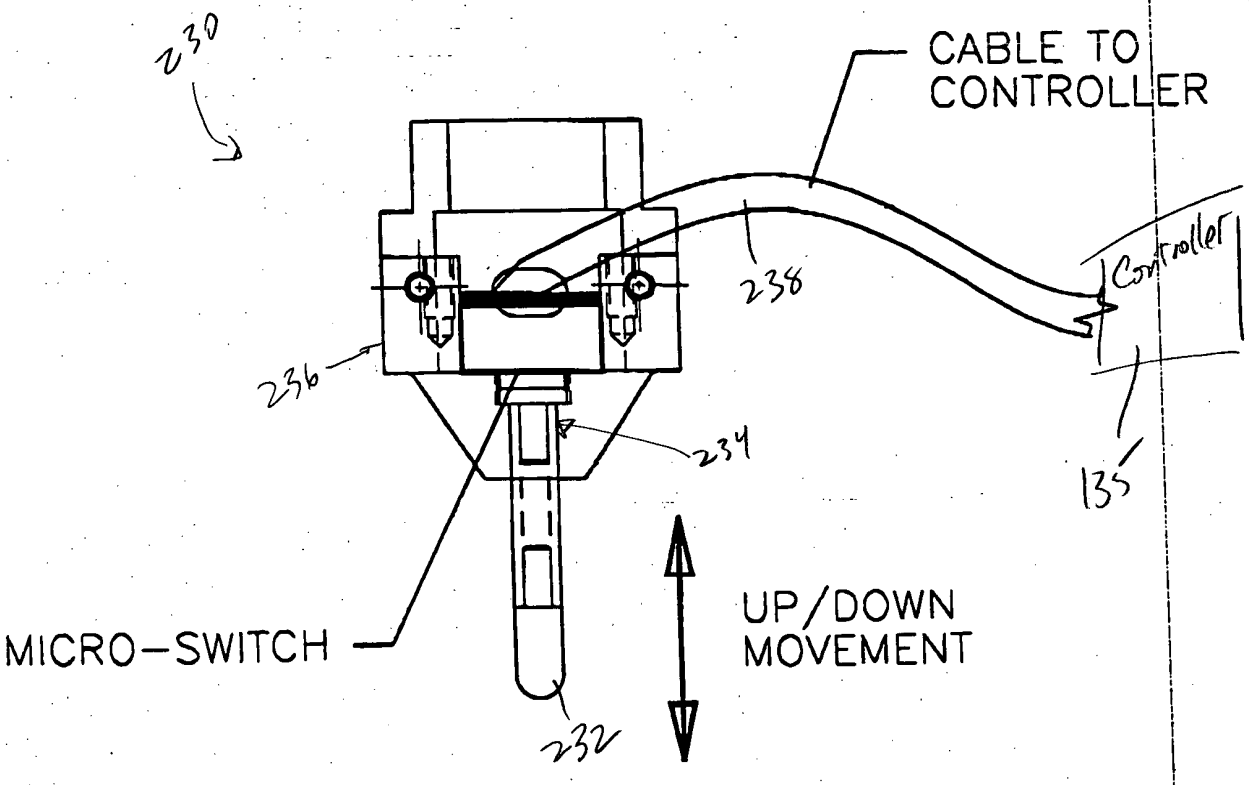

DO NOT SCALE

MACHINING TOLERANCE

IMPERIAL	METRIC
2 PLC DEC. +/- .010	1 PLC DEC. +/- 0.25
3 PLC DEC. +/- .001	2 PLC DEC. +/- 0.025
4 PLC DEC. +/- .0005	

REMOVE ALL BURRS AND BREAK SHARP EDGES
CHAMFER ALL TAPPED HOLES
.438mg TO 1/32 OVER TAP SIZE

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DEV.	SHT.	AMT.	DESCRIPTION

2175 Solar Crescent
Oldcastle, ON
N0R 1L0
Can.:(519) 737-6330
USA: (313) 965-2900

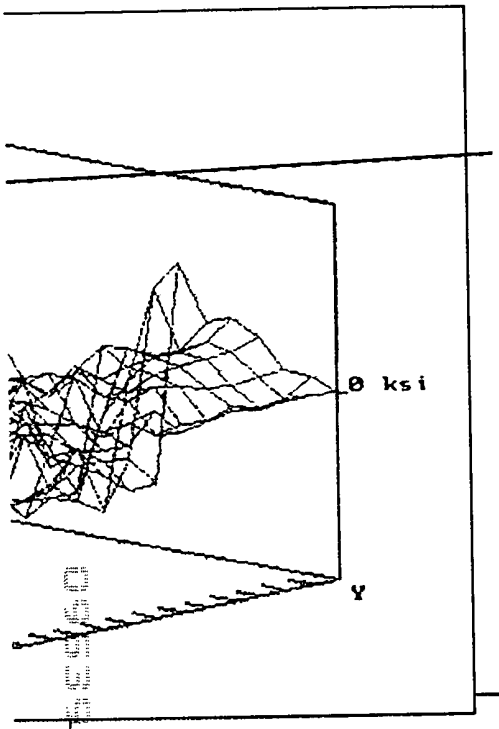
TITLE: FOCUS POINTER

DATE	SCALE	JOB NO.	REV NO.
20000327			A

DRAWN BY	CHK'D	APV'D	PART NO.
JBC			RD-103

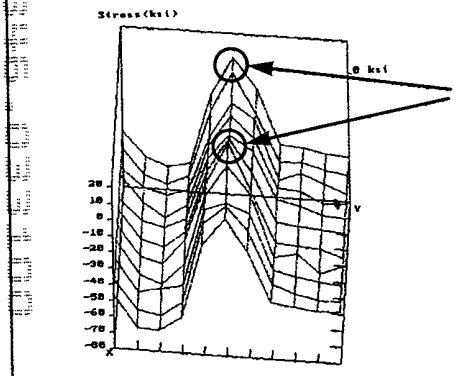
SHEET NO. OF

10/10



NOTE: Localized area of high tensile stresses in heat affected zone presents greater potential risk of crack initiation. This area may not have been detected without the application of automated stress mapping.

FIG 13A



NOTE: Localized tensile stress areas which may not have been detected without automated stress mapping.

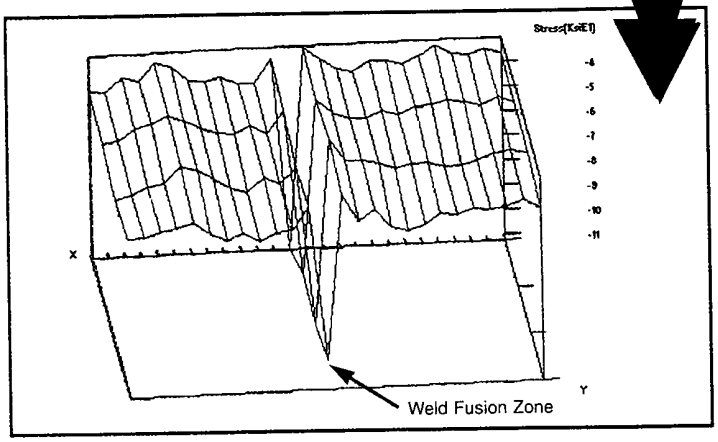
Laser Welded Stainless Steel Pipe

The residual stress in a 316 stainless steel pipe that was laser welded was mapped through the weld and parent material. The concern was that the laser weld has created tensile residual stress levels near yield which could decrease the burst strength of the pipe while in service.

The residual stress map above reveals localized tensile residual stress areas in the center of the laser weld. If this section of pipe were placed in service, the tensile residual stress maxima already existing in the center of the weld would be increased even more due to the applied stress of the working pressure on the pipe, thus making this area highly susceptible to SCC. Some post weld residual stress management process would be recommended to introduce compressive surface stresses in the weld and HAZ.

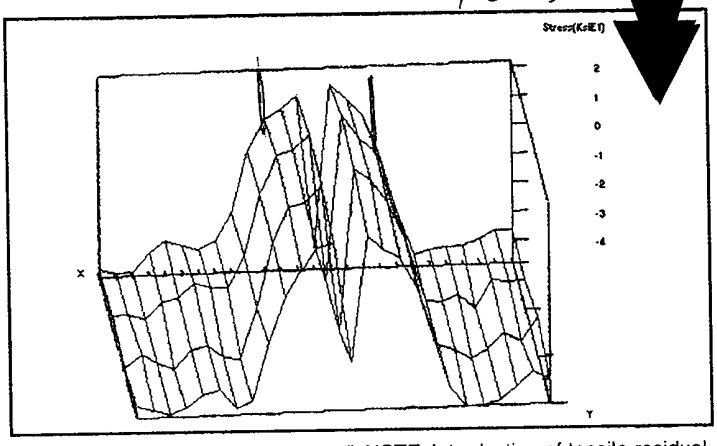
RESIDUAL STRESS TRACKING© (RST©)

Characterizing Residual Stress on the same component after different processes to solve premature fatigue failure.



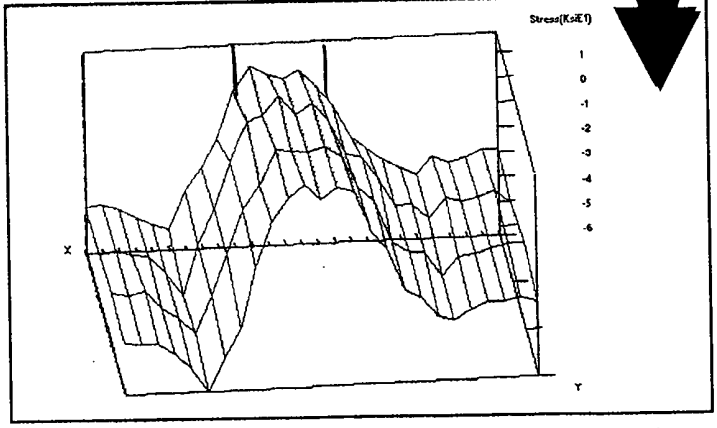
The residual stress map after resistance welding.

FIG 13B



The same weld after "heat treatment". NOTE: Introduction of tensile residual stresses sufficient to reduce fatigue life.

FIG 13C



The same weld after hand grinding further introducing counter productive tensile stresses.